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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,136	07/12/2005	Adrianus Johannes Maria Van Tuijl	NL 030082	9780

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EXAMINER	
WAMSLEY, PATRICK G	

ART UNIT	PAPER NUMBER
2819	

DATE MAILED: 12/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/542,136	VAN TUIJL, ADRIANUS JOHANNES MARIA	
	Examiner	Art Unit	
	Patrick G. Wamsley	2819	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07/05, 12/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to because none of the boxes in Figs. 1, 4, and 5 have labels. Adding labels corresponding to the individual elements, such as DAC 6 in Fig. 1, would help to further explain the invention.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: -- Analog-to-Digital Converter Having Interleaved Coarse Sections Coupled to a Single Fine Section --.

The disclosure is objected to because of the following informalities:

Page 2, line 14: Change "converters has" to -- converters have --.

Page 2, line 15: Change "can de" to -- can be --.

Page 4, line 11: Change "divided in two" to -- divided into two --.

Page 5, line 20: Change "round off" to -- rounded off --.

Page 6, line 9: Change "round off" to -- rounded off --.

Page 6, line 16: Change "capacity" to -- capacitance --.

Page 6, line 17: Change "capacity" to -- capacitance --.

Page 7, line 22: Change "rate be made" to -- rate can be made --.

Page 7, line 24: Change "is applied" to -- are applied --.

Page 9, line 29: Change "in stead of" to -- instead of --.

Page 10, line 26: Change "made to these" to -- made to this --.

Appropriate correction is required.

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims 5, 7, 8, and 11 are objected to because of the following informalities:

Claim 5, line 4: Change "sample- and hold" to -- sample-and-hold --.

Claim 5, line 7: Change "hold amplifier" to -- hold buffer amplifier --.

Claim 7, line 4: Change "the said" to -- the --.

Claim 7, line 4: Change "sample- and hold" to -- sample-and-hold --.

Claim 7, line 7: Change "hold amplifier" to -- hold buffer amplifier --.

Claim 8, line 4: Change "sample- and hold" to -- sample-and-hold --.

Claim 8, line 7: Change "sample- and hold" to -- sample-and-hold --.

Claim 11, line 1: Change "claim 9" to -- claim 10 --.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 3, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,138,319 to Tesch, hereafter Tesch, listed in the International Search Report and the 12/14/2005 IDS.

For independent claim 1, Tesch discloses an analog-to-digital conversion, hereafter ADC, arrangement [Fig. 2] for converting an analog input signal [V_{in}] into a digital output signal [out_data], having most [MSB] and least [LSB] significant parts. Cotter's ADC comprises sample means [an acquisition/sample phase precedes the conversion/hold phase: col. 4, lines 35-36], a plurality of coarse ADCs [using coarse DACs 40a/40b] and a fine ADC [using fine DAC 40c]. During coarse ADC operation, interleaving of even [40a] and odd [40b] data streams occurs. Claim 9 restates the apparatus limitations of claim 1 in method format.

For claims 2 and 3, both Tesch's fine and coarse ADCs are coupled to a successive approximation register [30], hereafter SAR.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tesch in view of U.S. Patent 5,689,260 to Vallancourt, hereafter Vallancourt.

Unlike claim 4, Tesch does not mention over-ranging for coarse conversion. In contrast, Vallancourt describes an over-ranging operation [col. 3, lines 55-56] for a coarse conversion circuit [12]. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied Vallancourt's over-ranging teachings to Tesch's ADC. The motivation would have been to reduce power consumption, as suggested by Vallancourt [col. 1, lines 56-57].

Claims 5, 6, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tesch in view of U.S. Patent 5,621,409 to Cotter et al, hereafter Cotter, also listed in the International Search Report and the 12/14/2005 IDS.

Unlike claims 5-8, Tesch does not mention a combination of sample-and-hold, amplifier, comparator, and coarse DAC circuits with a common digital control unit. In contrast, Cotter provides coarse [32] and fine [34] buffers coupled to a dual sample-and-hold amplifier [46]. Cotter's coarse ADC [48] uses a comparator [49] and has its amplifier [46] coupled to a DAC [52]. Digital control logic [74] governs all operations within Cotter's ADC. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied Cotter's teachings to Tesch's ADC. The motivation would have been to permit faster operation [col. 2, line 45].

For claim 6, in the Tesch/Cotter combination, Tesch's pair of coarse DACs [40a/40b] would have been simplified to a common coarse DAC by means of Cotter's interleaving technique [col. 11, lines 25-47].

For claim 7, Cotter's DAC has multiple capacitive ladders [Fig. 2]. The fourth capacitive ladder includes LSB capacitors [col. 5, lines 50-51] corresponding to the

claimed fine DAC, applicable to the least significant part of the signal. This ladder is coupled to the same sample-and-hold [46], buffer [34], comparator [49] and digital control logic [74] elements described for claim 5 above.

For claim 8, Cotter's fourth ladder has an additional dummy LSB capacitor [355] for use in calibrating the DAC [col. 5, lines 52-53]. As shown in Fig. 2, this switching arrangement would reduce charge redistribution among the capacitive ladders.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tesch in view of U.S. Patent 6,590,518 to Taft, hereafter Taft.

Unlike claims 10 and 11, Tesch does not mention a signal processing system. In contrast, Taft indicates that ADCs are useful in digital signal processing applications [col. 1, lines 14-15]. For claim 11, Taft specifically identifies video, imaging, and communication applications for ADCs [col. 1, lines 15-16]. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied Taft's teachings to Tesch. The motivation would have been to apply Tesch's ADC to useful technologies, as suggested by Taft [col. 1, lines 14-16]. Moreover, while not specifically disclosed in Tesch, application of Tesch's ADC to video environments would have been an evident use to the skilled artisan.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,653,966 to van der Goes et al uses coarse and fine ADC capacitors [Fig. 7]. U.S. Patent 6,340,943 to Chow et al provides first [102] and second [104] partial ADCs.

U.S. Patent 6,177,901 to Pan et al shows first and second ADC stages [Fig. 9]. U.S. Patent 6,177,899 to Hsu presents fine and coarse comparators [245] for an ADC. U.S. Patent 5,689,260 to Vallancourt describes coarse [12] and fine [14] conversion circuits. U.S. Patent 5,489,904 to Hadidi couples a coarse ADC [18] to a fine ADC [30]. U.S. Patent 5,126,742 to Schmidt et al discloses an ADC having a coarse unit [12] for MSBs and a double folding circuit [20] for LSBs. U.S. Patent 5,006,853 to Kiriaki et al shows a SAR ADC having coarse [24] and fine [26] comparators.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick G. Wamsley whose telephone number is (571) 272-1814. The official facsimile number is (571) 273-8300. An alternate facsimile number, (571) 273-1814, should only be used for unofficial documents.

Patrick G. Wamsley

December 21, 2005